

# Lightweight Metal Rubber Wire and Cable for Space Power Systems, Phase I

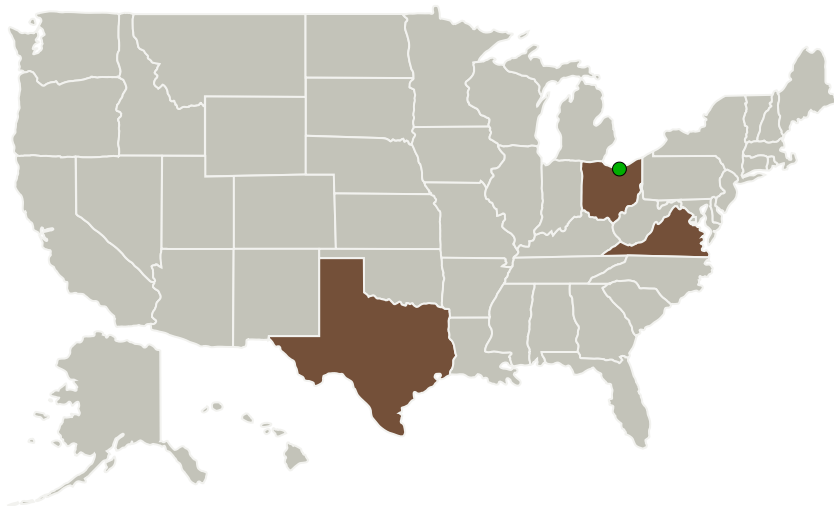
Completed Technology Project (2011 - 2012)



## Project Introduction

The objective of this NASA STTR program is to produce ultra-lightweight electrical wire and cable harnesses to reduce the liftoff weight of future space flight vehicles. In cooperation with materials scientists at Texas A&M, NanoSonic would develop and manufacture ultra-lightweight Metal Rubber- and carbon nanotube-based rubber (CNT Rubber) wire and cables with performance equivalent to that of conventional copper cables but with only 10% the weight. Wiring harnesses contribute significant weight load to the spacecraft structure. Ultra-lightweight Metal Rubber and CNT Rubber wires and cables can reduce that weight while offering comparable or superior electrical power and data transmission performance and EMI resistance. During Phase I, NanoSonic would design, fabricate and test lightweight Metal Rubber and CNT Rubber wire and cable prototypes. Texas A&M's nanotechnology laboratory would co-develop methods for CNT Rubber production and evaluate resulting material properties. The conducting core and outer shielding layers would be fabricated by molecular-level self-assembly. Electrically-conducting cable shielding tape layers would be dimensioned using CAD-driven templating equipment at NanoSonic. Wire and cable would be manufactured using wire feed, dielectric extrusion and shielding tape winding steps. NanoSonic is working with a major U.S. cable manufacturer and a major U.S. spacecraft prime contractor on this program.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nanosonic, Inc.	Lead Organization	Industry	Pembroke, Virginia
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
Texas A & M University-College Station(Texas A&M)	Supporting Organization	Academia	College Station, Texas

## Primary U.S. Work Locations

Ohio	Texas
Virginia	

## Project Transitions

▶ **February 2011:** Project Start

✓ **February 2012:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138678>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Nanosonic, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

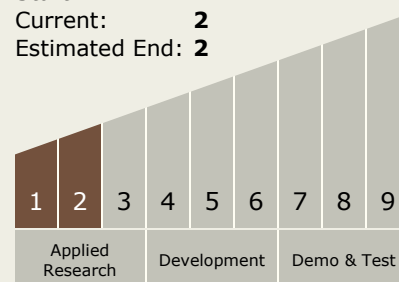
Carlos Torrez

### Principal Investigator:

Richard O Claus

## Technology Maturity (TRL)

Start: **1**  
Current: **2**  
Estimated End: **2**



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## Technology Areas

### Primary:

- TX03 Aerospace Power and Energy Storage
  - └ TX03.3 Power Management and Distribution
    - └ TX03.3.2 Distribution and Transmission

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System